Abstracts

Investigation of Millimeter-Wave Scattering from Frequency Selective Surfaces

T.R. Schimert, A.J. Brouns, C.H. Chan and R. Mittra. "Investigation of Millimeter-Wave Scattering from Frequency Selective Surfaces." 1991 Transactions on Microwave Theory and Techniques 39.2 (Feb. 1991 [T-MTT]): 315-322.

A comparative numerical and experimental analysis of scattering from dielectric-backed frequency selective surfaces in W-band (75-110 GHz) has been carried out. The examples studied include metal (aluminum), resistive (bismuth), and bismuth-loaded I-pole or "linearized" Jerusalem cross arrays on fused silica, all of which exhibit a band-stop resonance in W-band as a general feature. The arrays were fabricated using standard photolithographic techniques. The numerical analysis involves the solution of an electric field integral equation rising subdomain "rooftop" basis and testing functions within the framework of the Galerkin testing procedure. The lossy nature of the materials has been fully accounted for. A comparative analysis of doubly stacked aluminum I-pole arrays was also carried out. The numerical analysis exploits a variant of the cascade method in that the immediately adjacent dielectric layers are included in the constriction of the scattering matrix for the frequency selective surface. This allows the higher order evanescent Floquet modes to sufficiently decay at the dielectric boundaries so they can be ignored in the scattering matrix.

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